Vanguard Managed Solutions

Vanguard Applications Ware
SNA Feature Protocols

IBM 2260

Notice

Restricted Rights Notification for U.S. Government Users

Proprietary Material

Overview

Introduction

This document describes how to configure and maintain the IBM 2260 PAD protocol. It describes:

- Hardware requirements and features
- Configuration of the IBM 2260 option
- Statistics
- Operation and administration information

Configuration worksheets are also provided.

Trademarks

IBM is the trademark or registered trademark of the International Business Machines Corporation.

Alarms

Refer to the *Vanguard Applications Ware Alarms and Reports Manual* (Part Number T0005) for the IBM 2260 alarm information.

In This Manual

About the IBM 2260 PAD Protocol

Introduction

The IBM 2260 PAD protocol provides access to X.25 networks for hosts and terminals in an IBM 2260 multipoint environment. IBM 2260 support consists of IBM 2260 TPADs emulating FEP (Front End Processor) units and IBM 2260 HPADs emulating terminals. The IBM 2260 TPADs and HPADs communicate through a standard X.25 link that is implemented on Vanguard nodes. An EIA232-C interface physically connects the node PAD port to the attached device.

The IBM 2260 PAD protocol defines the set of messages and procedures that maintain connections and transfer data between the FEP and the terminals over the X.25 network.

TPAD and HPAD Support

The IBM 2260 PAD Protocol supports Poll and Select procedures on both TPADs and HPADs.

Typical Application

Figure 1 shows an example configuration of a network with the IBM 2260 PAD Protocol.
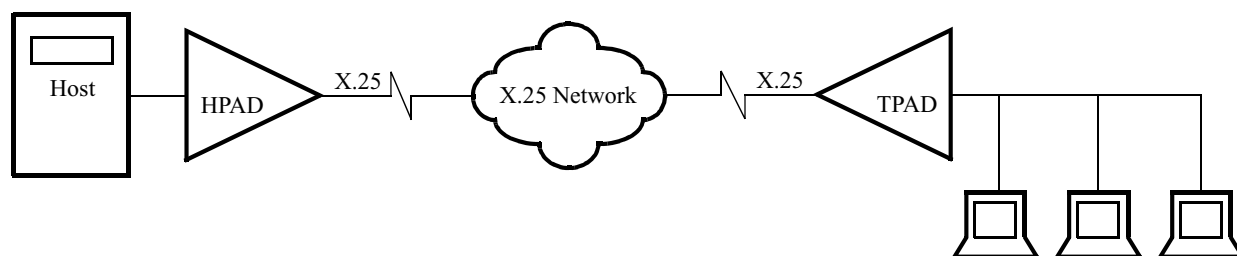
Figure 1. IBM 2260 Used in X.25 Network

How It Works

The IBM 2260 PAD on a Vanguard node allows the IBM 2260 host to connect to remote IBM 2260 terminals using an X.25 packet-switched network. Without a packet switched network, the terminals are directly connected to the host FEP using multi-dropped modem links. The HPAD port connected to the host emulates the IBM 2260 terminal by responding locally to Polling and Selection from the Host and forwarding data messages from/to remote terminals using the packet-switched network.

The TPAD port emulates the host by selecting and polling terminals and then forwarding data messages to and from the IBM 2260 terminals connected to the port. A single node may have multiple IBM 2260 PAD ports configured.

Either the TPAD or the HPAD can be configured as call originator, but not both. The call mnemonic is configurable per station, which allows TPAD stations from different nodes to be concentrated to a single HPAD port.

Features   The IBM 2260 PAD Protocol supports these features:

- Network spoofing for improved end-to-end throughput
- Network end-to-end acknowledgment
- Billing Records option
- Call originator configurable as either HPAD or TPAD
- Clock speeds from 1200 to 19200 bps

Feature Limitations   These are the limitations of the IBM 2260 PAD protocol:

- The HPAD and TPAD allow up to 32 stations per port. The total number of stations configured per node is 256. If a node is configured with a combination of BSC3270, NCR BSC, BSTD, and IBM 2260, the total number of devices/stations configured for these protocols cannot exceed 256.
- The maximum message text size handled within this specification is 2048 characters, including STX and ETX. Any terminal or FEP message that exceeds this maximum will be rejected.

IBM 2260 Supported Hardware   IBM 2260 HPAD supports:

- Docutel hosts
- Diebold hosts
- NCR hosts

IBM 2260 TPAD supports most IBM 2260 terminals, including these specific types:

- Teleray terminals
- DataTroll FT32 terminals

■**Note**
DataTroll equipment differs from other equipment during POLL procedures. Only the first address character, AD1, is checked to determine if a DataTroll is responding.

Compatibility   The IBM 2260 PAD protocol software is supported on Vanguard products. Refer to your latest Software Release Notice for details on supported platforms.

Node Record

Introduction

Additional configuration parameters to the Node Record are:

- Quantity of DSP Devices
- Quantity of SES Devices

Parameters

These tables describe the additional parameters in the Node Record that you configure.

Quantity of DSP Devices

Range:	1 to 1024
Default:	Dependent on the Vanguard product being used.
Description:	Maximum configured number of DSP-type devices on this node.
	Set this value close to the actual number of devices configured in the node, since each device allocated consumes a data buffer whether or not the node has an associated device.
	■**Note**
	You must perform a node boot for changes to this parameter to take effect.

Quantity of SES Devices

Range:	1 to 1024
Default:	Dependent on the Vanguard product being used.
Description:	Maximum configured number of SES-type devices on this node.
	Set this value close to the actual number of devices configured in the node, since each device allocated consumes a data buffer whether or not the node has an associated device.
	■**Note**
	You must perform a node boot for changes to this parameter to take effect.

Port Record

Introduction	This section describes the configuration parameters for the IBM 2260 ports.

Configuring the IBM 2260 Port Record	The IBM 2260 Port Record contains information about the IBM 2260 PAD port. To define an IBM 2260 port:

Step	
1	Select **Configure** from the Main menu.
2	Select **Port** from the Configure menu.
3	At the prompt, enter the number of the port you want to configure. For Port Type, enter **IBM 2260**.

IBM 2260 Port Parameters	The IBM 2260 Port parameters are described in the order that they appear on the screen. When you configure a port for IBM 2260 operation, the Port Configuration parameters differ from those used to configure other port types.

Port Number

Range:	1 to 54
Default:	1
Description:	Enter the number of the port to be configured. The Port Record reference number corresponds to the physical port position on the rear of the unit.

Port Type

Range:	PAD, NULL, X.25, IBM 2260 (Other options may appear on screen if they have been enabled by a CSK.)
Default:	PAD
Description:	Specifies the port type. Enter IBM 2260 to configure this port for IBM 2260 PAD protocol. ■**Note** You must perform a node boot for changes to this parameter to take effect.

PAD Type

Range:	TPAD, HPAD
Default:	TPAD
Description:	Specifies the PAD type: • TPAD: Port functions as a terminal PAD. • HPAD: Port functions as a host PAD.

Clock Speed

Range:	1200, 1800, 2400, 4800, 7200, 9600, 19200 (bps)
Default:	1200
Description:	Specifies the port speed in bits per second.

Connection Type

Range:	SIMP, SIMPa
Default:	SIMP
Description:	• SIMP: No EIA signals required. • SIMPa: CTS follows RTS.

Number of Stations

Range:	1 to 32
Default:	1
Description:	Specifies the number of IBM 2260 stations on this IBM 2260 line. ■**Note** Make sure that you configure each of these stations after configuring the port. ■**Note** You must perform a node boot for changes to this parameter to take effect.

Service Timer

Range:	10 to 60 (seconds)
Default:	30
Description:	Specifies the interval of time in seconds between periodic servicing (for example, the frequency of attempts to establish connections for active stations that are disconnected).

Error Threshold Count

Range:	1 to 255
Default:	3
Description:	Specifies the number of consecutive line protocol error conditions allowed before a terminal is considered nonoperational.

Response Timeout

Range:	400 to 5000 (in increments of 50)
Default:	500
Description:	Specifies the time in milliseconds that the PAD waits for a response. When this timer expires: • The TPAD may retransmit the previous message or abort the correct procedure. • The HPAD aborts the correct procedure as though EOT was received.

Port Subaddress

Range:	0 to 3 decimal digits
Default:	XX, where XX is the number of the port that you are configuring.
Description:	Calls addressed to this node and with this subaddress are routed to this port.

Port Options

Range:	NONE, ORG, ACK
Default:	ACK
Description:	• NONE: No options are specified. • ORG: Stations configured on this port will originate calls when they enter their active state. • ACK: All data messages sent from this port to the remote PAD port require an end-to-end acknowledgment message. The two options can be specified by summing (for example, ORG+ACK).

Restricted Connection Destination

Range:	0 to 32 (decimal)
Default:	(blank)
Description:	All calls originating from this port will be routed to the destination specified in this parameter, regardless of the route selection table entries.

Billing Records

Range:	ON, OFF
Default:	OFF
Description:	• ON: Billing for this IBM 2260 port is enabled. • OFF: Billing is disabled.

Station Record

Introduction	To define an IBM 2260 Station:

Step	Action	Result
1	Select **Configure** from the Main menu.	The Configure menu will appear.
2	Select **IBM 2260 Station** from the Configure menu.	The IBM 2260 Station Record selection display will appear.
3	At the prompt, enter the number of the port to which the station will be assigned.	

IBM 2260 Station Parameters	Listed below are descriptions of the parameters that make up the IBM 2260 Station Record:

Port Number

Range:	1 to 54
Default:	1
Description:	Indicates the physical port number of the IBM 2260 port that this station belongs to. The specified port must be configured as an IBM 2260 HPAD/TPAD port.

Entry Number

Range:	1 to 32
Default:	1
Description:	Used to reference a particular record. The range is determined by the number of stations configured for this port.
	The range corresponds to the number of IBM 2260 stations configured for this port.

Station Type

Range:	SINGLE, GROUP
Default:	SINGLE
Description:	• SINGLE: Selected to configure a single station addressable by the AD1-AD2 address pair.
	• GROUP: Selected when you are configuring a group of stations addressable by the AD1 address character, and AD2 is assumed to be 40H, 41H, 42H, and 43H.

Station Address

Range:	20 to 7F (hex) in the format xx,xx
Default:	20, 20 (hexadecimal)
Description:	Specifies the address of this station. It consists of two hex values that are entered separately.

Call Mnemonic

Range:	0 to 8 (alphanumeric characters)
Default:	(blank)
Description:	Used to specify a mnemonic name when a port is configured for originating connection requests. Refer to the *Vanguard Basics Manual* (Part Number T0113) for information about the Mnemonic Table.

Station Enabled

Range:	YES, NO
Default:	YES
Description:	Determines if the station is enabled (YES) or disabled (NO).

Statistics

Introduction

This section describes the statistics used with IBM 2260 PAD Protocol.

Detailed Port Statistics

Detailed Port Statistics provide status reports about various operations of an IBM 2260 port. To view the Detailed IBM 2260 Port Statistics:

1) Select **Status/Statistics** from the Main menu.

2) Select **Detailed Port Statistics** from the Status/Statistics menu.

3) At the prompt, enter the number of the selected port.

Example of Statistics

The IBM 2260 port statistics display is shown in Figures 2 and 3.

```
Node:                Address:              Date:            Time:
Detailed IBM 2260     Port Statistics: Port 3           Page: 1 of 2


 Port Number:3        Port Type:IBM 2260 TPAD           Port Status: Up
 Port Speed: 1200     Port State: IDLE                  Port Utilization: 0%
Physical:
Parity Errors: 0      Overrun Errors: 0    Framing Errors: 0
BCC Errors: 0         No Response: 0
Data Summary     In      Out      In      Out
Characters:     53200    2000                Characters/sec: 00
Messages:        1320    2186                Messages/sec: 00



Press any key to continue (ESC to Exit)...
```

Figure 2. IBM 2260 Port Statistics (Page 1)

```
Node:                Address:              Date:            Time:
Detailed IBM 2260     Port Statistics: Port 3`             Page: 1 of 2
Message Summary:                      IN           OUT
   Positive Acknowledgment:          522140
   Negative Acknowledgment:          00
   Number of Messages Retransmitted: 0


Press any key to continue (ESC to Exit)...
```

Figure 3. IBM 2260 Port Statistics (Page 2)

Description of Terms

The table below describes the terms used in the statistics screens.

Term	*Description*
Port Number:	Physical port number.
Port Type:	Indicates the type of access protocol for this port. It can be either of the following: • IBM 2260 HPAD • IBM 2260 TPAD
Port Status:	Operational Status of the port. The different operational statuses are: • UP: Indicates at least 1 station is responding to polls. • DOWN: Indicates none of the stations are responding to polls • DISABLED: Indicates the port is disabled by the user.
Port Speed	The configured port speed in bits per second.
Port utilization	The amount of the port's bandwidth that is being utilized. Because IBM 2260 is a half-duplex protocol, the utilization is calculated as the sum of the receive and transmit utilization.
Parity errors	The number of character parity errors counted by the I/O driver.
Overrun errors	The number of received character overruns counted by the I/O driver.
Framing errors	The number of asynchronous characters received which violated the character framing of start and stop bits.
BCC errors	The number of BCC errors counted by the I/O driver.
No Response	The number of times the response timer has expired.
IN	Refers to data flow direction that is going into the IBM 2260 port.
OUT	Refers to data flow direction that is leaving from the IBM 2260 port.
Characters	Total number of characters processed to present.
Messages	Total number of messages processed to present.
Characters/sec	Average number of characters processed to present.
Messages/sec	Average number of messages processed to present.
Message Summary	• Positive Acknowledgment: Number of ACKs processed to present. • Negative Acknowledgment: Number of NAKs processed to present.
Number of Messages Retransmitted	Number of messages retransmitted due to NAKs or timeouts to present.

IBM 2260 PAD Protocol

Term	*Description* (continued)
Port Stats	• IDLE: idle • TW4EOT: TPAD wait for EOT • HW4EOT: HPAD wait for EOT • TW4DR2D: TPAD wait for response to data • HW4DR2D: HPAD wait for response to data • W4DAP: wait for data after poll • HW4R2D: HPAD wait for response to data • TW4R2D: TPAD wait for response to data • W4DAA: wait for data after ACK • W4AAS: wait for ACK after Select • W4SOM: wait for start of message • HW4EOM: HPAD wait for end of message • TW4EOM: TPAD wait for end of message • W4R2N: wait for response to NAK

Operation and Administration

Introduction　This section describes the IBM 2260 PAD protocol pertaining to Station addressing and network connections between stations. Refer to your IBM 2260 documentation for more information about IBM 2260 procedures.

Station Address　You must configure each station on an IBM 2260 port with a unique Station Address. The TPAD uses this address when Polling and Selecting a terminal. The HPAD also uses it to recognize Polls and Selects sent from the FEP to an HPAD station.

Do not configure a port with two or more stations having the same Station Address or a SINGLE station having the same AD1 address as a GROUP station. When you boot the node, all but the first station will be inhibited and a report (for example, IBM 2260 – XX – Station Inhibited – YY,ZZ) is generated for each station that has a conflicting address.

Station Type　To accommodate the differences between DataTrolls and all other IBM 2260 devices, the IBM 2260 PAD includes a "station type" parameter in the station configuration. You can configure the "station type" for either SINGLE for non-DataTroll devices or GROUP for DataTroll devices. When configuring a SINGLE station, you must specify both AD1 and AD2. When configuring a GROUP station, the AD1 address character specifies the group and AD2 is assumed to include 40H, 41H, 42H, and 43H. Therefore, the AD2 configuration parameter is ignored for GROUP.

Network Connections　The operation of each Single station or Group station within an IBM 2260 port is independent from one another; therefore, one SVC is used for each pair of connected stations (for example, a group of DataTrolls would share an SVC from the TPAD to the HPAD connected to the host).

You can establish connections only between stations of the same type. You cannot establish a connection between a SINGLE and a GROUP station. You can configure only one of the two stations for a given pair as call originator. A station can originate a call once it is detected by the originating PAD as operational. Conversely, once a TPAD or HPAD station is detected as nonoperational, the call is cleared.

IBM 2260 Worksheets

Introduction   This section consists of two worksheets to help you with configuration of the port and station.

Port Record Worksheet   This is the IBM 2260 PAD Port Record Worksheet:

Parameter Name	Default	Range	Operator Entries		
Port Number	1 to 54	1			
Port Type	PAD	PAD, NULL, X.25, IBM2260			
PAD Type	TPAD	TPAD, HPAD			
Clock Speed	1200	1200, 1800, 2400, 4800, 7200, 9600, 19200			
Connection Type	SIMP	SIMP, SIMPa			
Number of Stations	1	1 to 32			
Service Timer	30	10 to 60 (sec)			
Error Threshold Count	3	1 to 255			
Response Timeout	500	400 to 5000 (msec)			
Port Subaddress	XX	0 to 3 BCD digits			
Port Options	ACK	NONE, ORG, ACK			
Restricted Connection Destination	(blank)	0 to 32 alphanumeric characters			
Billing Records	OFF	ON, OFF			

Station Record Worksheet

This is the IBM 2260 PAD Station Worksheet:

Parameter Name	Default	Range	Operator Entries		
Port Number	1	1 to 54			
Entry Number	1	1 to XX			
Station Type	SINGLE	SINGLE, GROUP			
Station Address	20; 20 (hex)	20 to 7F; 20 to 7F (hex)			
Call Mnemonic	(blank)	0 to 8 alphanumeric characters			
Station Enabled	YES	YES, NO			

IBM 2260 PAD Protocol